

REMARKS

Applicants thank the Examiner for the first complete examination of the instant application. Claims 1-4 are currently pending in this application. Dependent claim 2 has been amended by way of this Amendment. Claim 1 is independent. Reconsideration of this application, as amended, is respectfully requested.

DRAWINGS OBJECTION

The Examiner has objected to the drawings in the current Office Action. That is, the Examiner requests that the “annular insulator 4 include crosshatching.” Applicants have carefully reviewed the drawings and believe that the annular insulator 4 is properly crosshatched in Figure 1. The Examiner is respectfully requested to clarify the drawings objection in response hereto. Absent this clarification, Applicants respectfully submit that the Figures of the drawings are properly illustrated in their current form.

SPECIFICATION OBJECTION

The Examiner requires clarification of the formula set forth in paragraph 10, page 3 of the specification. In particular, the Examiner points to the portion of the formula “ $Z \geq 1$.” In response to the specification objection, Applicants have amended the formula to read as $Z \geq 1 + \text{integer}(\sqrt[3]{(D_A - D_B) * s})$, at least 3. This correction to the formula obviates the specification objection.

The correction of the formula does not raise a new matter concern. In particular, the Examiner will note that paragraph 1 of the substitute specification incorporates by reference the entire contents of PCT International Application No. PCT/DE00/00576. The Examiner's review of the PCT International Application will reveal that the formula therein is consistent with the Amendment to the specification presented hereby.

REJECTIONS UNDER 35 U.S.C. § 112

Claims 2 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed.

In response to the rejection, Applicants have amended dependent claim 2 to properly set forth the formula discusses hereinabove. The formula as amended in dependent claim 2 is consistent with the specification amendment presented by this Amendment.

In addition to the above, the Examiner also requests clarification of the formula set forth in dependent claim 2. The determination of the variable Z is based on the value of one summed with an integer value. The integer is the cube root of the difference of D_A and D_B multiplied with a thickness value s . The formula, as amended, is clearly in proper format.

In accordance with the above, Applicants respectfully request reconsideration and withdrawal of the claim rejection under 35 U.S.C. § 112, second paragraph.

REJECTION UNDER 35 U.S.C. § 103(A)

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hakamata et al., U.S. Patent No. 5,763,848 in view of Cherry et al., U.S. Patent No. 4,216,360 and Stegmüller, U.S. Patent No. 4,962,289. This rejection is respectfully traversed.

Independent claim 1 sets for a combination of limitations including “the power current connection of the moving contact tip being in the form of a cylindrical bolt,...the power current connection of the stationary contact tip is in the form of a plate,...[and] a membrane which is provided with concentric corrugations, is in the form of a disk and is soldered on one side to the power current connection of the moving contact tip and on the other side via an axially running annular flange to the annular insulator.” Applicants respectfully submit, for the following reasons, that the patent documents relied upon by the Examiner, either in combination together or standing alone, fail to teach or suggest at least these limitations of independent claim 1.

Hakamata et al. teach an electrode for a vacuum circuit breaker. As is illustrated in Fig. 5, the vacuum circuit breaker includes an insulator cylinder 1 that has a pair of end plates 2 and 12 secured at both ends of the insulator cylinder 1. The circuit breaker also includes a stationary electrode 4 and movable electrode 5. The stationary electrode 4 is connected to a conductor 6, and the movable electrode 5 is connected to a conductor 7. Hakamata et al. clearly indicate that the “structure of both electrodes is identical.” (See column 3, lines 61-62.)

The Examiner states that Hakamata et al. “disclose the instant claimed invention except for: a power current connection of the stationary contact tip is in the form of a plate and a membrane disk with concentric corrugations, number of which should be at least 3.” Applicants

respectfully submit that the Examiner's statement only touches upon a few of the deficiencies of the Hakamata et al. patent document, when viewed in the light of the instant claimed invention.

In order to attempt to make up for the deficiencies of the Hakamata et al. patent document, the Examiner has relied upon Cherry et al. Cherry et al. teach a low voltage vacuum switch having an internal arcing shield. The low voltage vacuum switch according to Cherry et al. is illustrated in Fig. 1 of the relied upon patent document. As seen in the figure, a low voltage vacuum switch 10 includes an annular insulating ring body portion 12. In addition, the low voltage vacuum switch 10 includes a pair of cylindrical conductive contact members 14a and 14b. Additionally, the switch 10 includes a mounting means 18a and 18b, which are electrically connected to cylindrical contacts outside the vacuum switch 10. (See column 3, lines 8-12.)

In addition to the above discussed patent documents, the Examiner has relied upon a patent to Stegmüller. Stegmüller teaches a switch chamber for a vacuum switch. As is illustrated in Fig. 4 of the relied upon patent document, a corrugated member 24 is fastened to a ring 25 and a contact pin 3 at a point outside an evacuable portion of the switching chamber. (See column 5, lines 55-58.)

Detailed analysis of each of the patent documents relied upon Examiner clearly shows that the documents relied upon by the Examiner, either in combination together or standing alone, fail to at least teach or suggest "a membrane...in the form of a disk and is soldered on one side to the power current connection of the moving contact tip and on the other side via an axially running annular flange to the annular insulator."

In addition, the Applicants respectfully submit that one of ordinary skill in that art would not look to Cherry et al. in order to modify the invention according to Hakamata et al. Specifically, as it is discussed hereinabove, Hakamata et al. discuss the fact that the structure of both electrodes 4 and 5 are identical. (See column 3, lines 60-64.) Moreover, each of these electrodes 4 and 5 includes identical conductors 6 and 7. To attempt to modify this structure according to Hakamata et al. with the teachings of Cherry et al. would destroy the operational functionality of the Hakamata et al. device. That is, attempting to substitute a planar mounting means 18a according to Cherry et al. for the conductor 6 would destroy the fundamental operating manner of the Hakamata et al. vacuum circuit breaker.

In accordance with the above comments, Applicants respectfully request reconsideration and withdrawal of the claim rejection under 35 U.S.C. § 103(a).

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is condition for allowance.

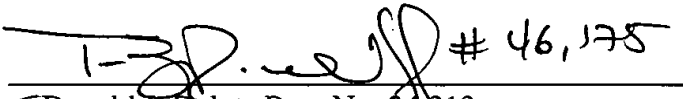
If the Examiner believes, for any reason, that personal communication will expedite the prosecution of this application, the Examiner is invited to telephone Timothy R. Wyckoff (Reg. No. 46,175) at (703) 668-8000 in the Washington D.C. area.

Prompt and favorable consideration of this Amendment is respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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VERSION OF MARKED-UP CHANGES

IN THE SPECIFICATION

The specification has been amended as follows:

Page 1, paragraph 0010

In order to ensure the necessary number of switching operations (at least 10,000 for example) for a switching movement of about 3 to 5 mm with this abnormal use of a membrane for a vacuum switching chamber which is used in a low-voltage A.C. power supply system, the number and depth of the corrugations for the membrane have to be designed appropriately. For this purpose, a further refinement of the invention provides that, with a wall thickness of between 0.1 and 0.2 mm and a corrugation depth of approximately half the switching movement, the membrane has a number Z of full corrugations which is greater than 1 + integer of the cube root of the external membrane diameter D_A minus the power current connecting bolt diameter D_B multiplied by the wall thickness s of the membrane, but at least 3, with the individual dimensions to be used being in millimeters. The boundary condition mentioned above is expressed as a mathematically formulated relationship as follows:

$$Z [\tau] \geq 1 + \text{integer} (\sqrt[3]{[(D_A - D_B) * s]}), \text{ at least } 3.$$

IN THE CLAIMS

The following claim has been amended:

2. (Twice Amended) The vacuum switching chamber as claimed in claim 1, wherein, for a switching movement of 3 to 5 mm, the membrane includes:

- a wall thickness s of between 0.1 and 0.2 mm,
- a corrugation depth t of approximately half the switching movement, and
- a number Z of full corrugations, all of which satisfy the condition $Z [\tau] \geq 1 + \text{integer } (\sqrt[3]{[(D_A - D_B) * s]}), \text{ at least } 3$, where D_A = external diameter of the membrane, D_B = diameter of the power current connecting bolt of the moving contact tip, and s = thickness of the membrane.